

Syllabus

Medical *Cannabis*

Pharm 200

Spring 2018

T,R Time: 4:25-5:40

Location: Rowell 103

Directors:

Karen Lounsbury, PhD

Professor of Pharmacology

karen.lounsbury@uvm.edu

Wolfgang Dostmann, PhD

Professor of Pharmacology

wdostman@uvm.edu

Monique A. McHenry, PhD

Assistant Professor of Pharmacology

mmchenry@uvm.edu

Course Description

Pharmacology 200, *Medical Cannabis* will be offered by the Department of Pharmacology in the Spring Semester 2018 as an introductory level Pharmacology course for undergraduate and graduate students. This course will use *Cannabis* as a springboard to introduce fundamental concepts in Pharmacology (the science of drug actions). The *Cannabis* plant has an interesting history, and recent policy changes have led to an explosion in *Cannabis* science. Lectures intersperse historical, political, and social background information with more advanced scientific concepts in pharmacology and medicine.

The course will be divided into five areas of content: 1) plant biology, 2) biological effects on humans, 3) Cannabis analytic chemistry, 4) clinical research, and 5) business, law, and policy. We will also discuss current information about the Vermont experience with medical marijuana. This course will provide students with a foundation of up-to-date scientific knowledge in a complex and evolving area of medicine, while introducing key concepts in human physiology and pharmacology.

Course learning goals

This course is intended to be a unique experience for students to develop a broad understanding of *Cannabis* and its medicinal use, with more advanced concepts relevant to pharmacology and medicine in the context of the following specific objectives:

1. Discover the important milestones in the human use of *Cannabis*
2. Gain an understanding of how plants are classified and the implications this has on writing *Cannabis* policies.
3. Explore the chemical compounds found within *Cannabis* and different methods used to extract its specific psychoactive other neural effects
4. Examine the spectrum of medicines and toxins provided by natural products
5. Detail the basic pharmacological properties of cannabinoids including their absorption and metabolism as well as their mechanisms of action
6. Discuss the biology of addiction and compare *Cannabis* with other drugs of abuse
7. Develop knowledge of the physiology and pathology underlying neurological and inflammatory disorders including chronic pain, epilepsy, multiple sclerosis, and migraine
8. Catalog the evidence-based studies that detail the benefits of cannabis in the treatment of several neurological and inflammatory disorders
9. Utilize a balanced academic approach to dispel myths surrounding the benefits and toxicities associated with *Cannabis* use

Readings

Required:

There is no required textbook, but readings will be regularly distributed to students.

Recommended Texts and Readings:

Hanson, Bryan Abbot. 2005. *Understanding Medicinal Plants: Their chemistry and therapeutic action*. MI: Haworth Herbal Press. Print.

Holland, Julie, Ed. 2010. *The pot book: A complete guide to Cannabis*. ME: Park Street Press.

Pertwee, Roger, Ed. 2014. *Handbook of Cannabis*. Oxford University Press.

Koehn FE, Carter GT. 2005. The evolving role of natural products in drug discovery. *Nature Reviews Drug Discovery*. 4:206-20.

Performance Goals

1. Participation: students will be expected to engage in lectures, readiness quizzes, assignments and exams.
2. Exam format: Exams will consist of a variety of short answer type questions (multiple choice, matching, true/false, short essay). Students taking the course for graduate credit will have additional essay questions on the exams, expanded case study assignments and will be required to write a 10-page paper on a course-related topic approved by the course director.
3. ***Written Assignments:** All students will be required to submit written assignments that will require outside research and scientific writing. See description below for more details.

Grading

We will use the following tentative grading scheme:

Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Exam	20%
Assignments	20%

Academic honesty: You are expected to maintain a high standard of academic honesty. Please read about UVM's Academic Honesty Policy at <http://www.uvm.edu/policies/student/acadintegrity.pdf> Be particularly careful to avoid plagiarism when working on written assignments.

Religious holidays: You have the right to practice the religion of your choice. Each semester, you should submit in writing to your instructors by the end of the second full week of classes your documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observances to make up this work.

Illness: For your own health and that of others around you, if you are sick with a fever or other severe illness, please do not attend class. We will arrange for you to make up the material and/or extend deadlines and exams as deemed necessary.

<u>Tentative Course Schedule</u>		*Assignment Due
1/16	Course Introduction & Cannabis history	McHenry
<u>Section 1. Plant Biology</u>		
1/18	Plant taxonomy – Hemp or marijuana?	McHenry
1/23	Plant genomics – Developments and innovations	McHenry
1/25*	Plant chemicals – Defense or incentive?	McHenry
<u>Section 2. Cannabis Chemistry</u>		
1/30	Chemical phenotypes of cannabinoids	Dostmann
2/1	Introduction to Pharmacology and Pharmacognosy	Dostmann
2/6	Pharmacological actions of cannabinoids	Dostmann
2/8	EXAM 1 (Dostmann proctor)	
2/13	Human Cannabinoid Pharmacokinetics	Dostmann
2/15	Analytical chemistry of cannabinoids in plants and humans	Dostmann
2/20	Cannabinoids as drug targets	Dostmann
<u>Section 3. Biological Effects on Humans</u>		
2/22	Psychiatric responses to Cannabis	Lounsbury
*2/27	Biological basis of Cannabis addiction	Lounsbury
3/1	Effects of Cannabis on Pain and Nausea pathways	Lounsbury
3/6	BREAK - Town Meeting Day Recess	
3/8	EXAM 2 (Dostmann proctor)	
3/13	BREAK - Spring Recess	
3/15	BREAK - Spring Recess	
<u>Section 4. Clinical Research</u>		
3/20	Cannabinoids and inflammation pathways	Lounsbury
3/22	Cannabis for seizure disorders	Freeman
*3/27	Cannabis for motor disorders	Lounsbury
3/29	Cannabis for inflammation and pain	Freeman
4/3	Cannabis for cancer and associated symptoms	Lounsbury
4/5	Cannabis and the Endocrine System	Carr
4/10	Cannabis and mental health	Lounsbury
4/12	EXAM 3 (Lounsbury proctor)	
<u>Section 5. Business, Law, and Policy</u>		
4/17	Public Health and Safety impacts	Freeman
*4/19	Cannabis—Social deviance and early/late adapters	Lounsbury
4/24	Metabolism of Cannabinoids	(Guest) Bress
4/26	Field Testing of Cannabinoids	Dostmann
5/1	Cannabis Business, law & policy	McHenry
5/3	Current & future challenges in Cannabis Science	McHenry
5/10	FINAL EXAM (McHenry proctor) 4:30pm-7:15pm	

***Written Assignments:** All students will be required to submit 4 written assignments related to the course materials. The assignments will be assigned according to student level as described below.

Undergraduate

Students will use the lecture material and at least one outside source to review and discuss course topics. Students will be asked for form evidence-based opinions on topics related to medical uses.

Advanced Biology Credit

Students will use the lecture material and outside sources to review a topic and form a thesis for discussion. One of the assignments will include either an outline of a basic research proposal or clinical trial.

Graduate Student Credit

Students taking the course for graduate credit will be required to focus on primary literature and to present 4 scientific papers that integrate class area topics into an in-depth literature review. One of the assignments will include a hypothesis-based research plan and one will include basic design of a clinical trial. Students will be able to choose from several area topics presented prior to the due date.

Rubric:

- 1) Papers should be 2 pages in length, double-spaced.
- 2) Advance Biology and Grad Student papers must have at least 2 references from primary basic science literature. The remaining can be from textbooks, reviews or websites. Other levels should list references used being careful to choose reliable sources.
- 3) Papers will outline the background of the topic and then use specific examples from the literature that helped to develop the current understanding of the topic.
- 4) The final 2 Grad student papers will present a research proposal that includes a hypothesis and experimental design for a new study in medical cannabis (one basic research, one clinical trial).

A discussion section will also be used on blackboard for online discussion of recently published research or legislative news. All students will be expected to read the discussion, and graduate students will be expected to comment within the discussion thread.